DOCUMENT RESUME

ED 121 709 SP 009 911

AUTHOR Zeigler, Earle F.
TITLE The Education of "Ecological Man": Implications for Sport and Physical Education.
PUB DATE 3 Oct 75
NOTE 29p.; Paper presented at the Annual Meeting of the Canadian Association of Sport Sciences (Ottawa, Ontario, October 3, 1975)

EDRS PRICE MF-$0.83 HC-$2.06 Plus Postage
DESCRIPTORS Developed Nations; *Ecology; Economics; *Environmental Education; Ethics; Exercise (Physiology); *Health Education; History; Nutrition Instruction; *Overpopulation; Physical Education; Physical Fitness; *Pollution; Social Problems

ABSTRACT

Physical education and recreation educators have a responsibility to inform their students about the dangers to the ecological system in an over-populated, over-industrialized, and polluted world. As a start, they can teach their students how to remain personally fit through exercise and proper diet. Secondarily, they can discuss social issues (such as the necessity for developing countries to change their economies to ones which do not demand constant growth and the consequent abuse of the world's resources). Recreation and parks instructors can encourage an appreciation of our natural resources and can recommend participation in leisure activities which do not deplete the environment. The entire field of education is crucial in developing public attitudes which will be responsive to environmental issues. (CD)

****
* Documents acquired by ERIC include many informal unpublished *
* materials not available from other sources. ERIC makes every effort *
* to obtain the best copy available. Nevertheless, items of marginal *
* reproducibility are often encountered and this affects the quality *
* of the microfiche and hardcopy reproductions ERIC makes available *
* via the ERIC Document Reproduction Service (EDRS). EDRS is not *
* responsible for the quality of the original document. Reproductions *
* supplied by EDRS are the best that can be made from the original. *
****

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

THE EDUCATION OF "ECOLOGICAL MAN": IMPLICATIONS FOR SPORT AND PHYSICAL EDUCATION

Earle F. Zeigler
The University of Western Ontario
London

ED121709

Introduction*

The influence of ecology has only been felt in a recognizable and significant way for the past five or ten years by North American society; so, it is not unusual that very little attention has been paid to the environmental crisis by those related to sport and physical education. Our field cannot be especially criticized for this failing; as a matter of fact, the large majority of people conduct their lives in a manner which quite clearly indicates that they still don't appreciate the gravity of man's situation on Planet Earth. Very recently the writer has come to realize that this topic can also be considered a persistent problem to the field in the same way as the other five social forces of values, politics, nationalism, economics, and religion. Granted that it has not been with man over the centuries in similar fashion, the influence of ecology is now with man on a seemingly indefinite basis. No longer, as it has been almost always possible in the past when natural resources were depleted, can man simply move elsewhere to locate another abundant supply of game to hunt, water to drink, or -- for that matter -- mineral resources to exploit for his purposes.

Ecology is usually defined as the field of study which treats the relationships and interactions of man and other living organisms with each other and with the natural (or physical) environment in

SP009 911

* A paper presented at the Annual Meeting of the Canadian Association of Sport Sciences, Ottawa, Ontario, October 3, 1975

which they reside. Until very recently very few scientists were known as ecologists; they were identified either as biologists or zoologists. Now many of these scientists are being asked to consider man's situation (plight?) in relation to his environment in a much broader perspective than that in which an experimental scientist typically functions. His outlook must of necessity become macroscopic rather than microscopic -- and very few people are prepared to make this transition in such a relatively short span of time.

For a variety of reasons man can no longer proceed on the assumption that his responsibility is to "multiply and replenish the earth." In the past he has been exhorted to both increase the population and to develop an economy to cope with the various demands. Now there are close to four thousand million people on earth, and approximately four babies are being born somewhere in the world every second! It has also become starkly obvious to reflective people that strong attitudes favoring population control must be developed, or it is quite possible that some version of Malthusian Law will soon be operative on a massive scale. (Although there are some who disagree with such a statement today, the reader will recall that Thomas R. Malthus theorized in 1798 that the population tends to increase more rapidly than the food supply -- a question of geometric progression as opposed to arithmetical progression. This idea still seems valid today with the only possible checks being war, disease, natural catastrophes, famine, and birth control.)

Moving more directly into the realm of economics, it has been pointed out strongly that the United States -- as opposed to Canada -- for example, has some extremely difficult choices to make in the

next few decades; in fact, a number of these choices may necessarily be made because of the severe crises that the nation will encounter. Those who look ahead optimistically seem willing to allow a continuous-growth economic system, while those who will undoubtedly be classified as pessimists by many argue for the wisdom of a no-growth economic system (Murray, 1972, p. 38). It is imperative for us all to understand that the forecasting models developed by economists and ecologists quite typically differ sharply -- that is, the consequences of their recommendations, respectively, are so completely different. Certainly all are aware of contradictory economic theories that appear in the daily press, but it is also obvious that very few people, relatively speaking, are aware of the "collision course" seemingly being taken if the ecologic models have any validity at all. In an article entitled "The Ecologist at Bay," Grahame Smith explains that "The decline in quality of this planet and the precarious aspect of continued existence of life on Earth are largely the results of this comfortable shell of consumer technology with which each American is surrounded"(1971, p. 69). Thus, the ecologist finds himself in a situation where he comprehends fully the dangerous position in which <u>some</u> people on Earth -- a relatively few million as a matter of fact -- are ensconced. However, for the ecologist to cry out in alarm to the general populace in the favored countries any more vigorously, and to have them truly understand the reality of the precarious approach being followed generally, is to risk being ridiculed and being branded as a pessimist and doomsayer. Nevertheless, the problem is most definitely here, and it cannot be escaped by closing one's eyes. As Pogo, the cartoon possum, has stated -- and it is a

remark which we must accept ruefully -- "we have met the enemy, and he is us!"

In an effort to consider this problem more carefully and in the process to place it in some perspective for all educators -- and specifically those involved with sport and physical education -- the writer will (1) offer a few definitions; (2) present a brief historical background; (3) highlight the problem as it is faced in modern society; (4) analyze it from a particular philosophical perspective with implications for education generally and for sport and physical education specifically; and (5) offer a concluding statement.

Definitions

As a result of the development of ecology and what has been called "environmental science," many new words and phrases have been added to everyone's vocabulary. Ecology itself "is the science of the mutual relations of organisms with their environment and with one another" (Huxley, 1963, p. 6). Or, to be somewhat more precise, Murray states that "ecologists study competition between individuals and between populations for resources, the growth of populations and the movement of materials (e.g., water and minerals) in ecological systems (eco-systems)" (1972, p. 36). It is not possible or pertinent to define even the most common terms usually employed in this area of study here, but it should be understood that man has polluted the earth -- and is doing so now and may continue to do so in the future -- in both the biosphere (the zone of life) and in the remainder of the atmosphere. This includes that area from 35,000 feet up to perhaps 600 miles above the earth. The term "biosphere" explains

"that envelope made up of the Earth's waters, land crust, and atmosphere where all organisms, including man, live"(Kunz, 1971, p. 67). An ecosystem is "an integrated unit or 'system' in nature, sufficient unto itself, to be studied as a separate entity -- e.g., a rotting log in the forest, a coral atoll, a continent, or the Earth with all its biota" (Ibid.). Fortunately, many of these common terms are already recognizable at least, and hopefully their continued use in the various communications media will make them part of one's everyday vocabulary. A few such terms are, as follows: allowable release level, biodegradable, biota, carcinogen, coliform bacteria, compost, decibel, demography, effluent, energy cycle, green revolution, greenhouse effect, herbicide, atmospheric inversion, non-renewable resources, recycling, smog, sonic boom, symbiosis, thermal pollution, etc. (Ibid.)

Brief Historical Background

As was reported above, there are now approximately four thousand million (four billion!) people on earth. At the beginning of the so-called Christian era that figure was only (!) two hundred and fifty million. By the time America was settled by Europeans, that total had been doubled to about five hundred million -- in a period of only sixteen hundred years. Then by 1830 the figure had increased twofold again to one thousand million people in somewhat less than two hundred years. Next in one hundred years the amount doubled again to two billion, and now, in about only fifty years, the total number of men, women, and children on Earth is approaching four thousand million or four billion. As Huxley says, "By the year 2000, unless something appallingly bad or miraculously good should happen in the interval, six thousand millions of us will be sitting down to breakfast every morning" (1963, p. 2). And to make matters still worse -- if such

could be the case -- it is in the underdeveloped countries (e.g., India) where the rate of increase is so much higher than the average. It will presumably not be possible for such nations to move ahead to full industrialization because of the inevitable drain upon its basic resources by such rapid growth.

In another realm -- that of poor husbandry insofar as land and animal abuse are concerned -- man's careless and ignorant abuse of the planet probably goes as far back as 8,000 years ago when he first began to farm the land. There are today innumerable archeological sites that were once thriving civilizations. For a variety of reasons, including poor use of the land certainly, most of these locations are now dusty and desolate ruins. An example of such an area is North Africa that was once exploited extensively by the powerful Romans. The valuable topsoil here was undoubtedly eroded by poor farming techniques, incorrect grazing by livestock, and flagrant abuse of timberland.

One can go back somewhat further to Ancient Greece to find another example of once fertile land with an abundant supply of water and forested hills. Now much of the area seems blighted by rocky hills and barren lowlands denuded of their former topsoil. Wild life is almost extinct as well.

Much the same story can be related about early Turkey. Early port cities, such as Ephesus and Tarsus, offer no evidence today of their early history as valuable trading ports. The former "fertile crescent" of Biblical times has long since gone, and the "land between the rivers" (the Tigris and the Euphrates) shows almost no evidence of its former luxuriant state. Thus, turn where one will, to the areas desolated by fifteen century sheep-raisers in Spain, to the pre-Columbian American civilization on Monte Alban in Mexico,

or to many other, formerly highly desirable locations in the world, one is apt to find further examples of poor management and land and forest degradation. Obviously, there are some examples of wise endeavor by the people of different nations. The Netherlands (Holland) and Japan are two such countries, and such "shining examples stand out like beacons" in an otherwise often seriously ravaged landscape. The discussion that follows will describe concisely why the coming century will need to be characterized by a concern for this vital problem that has never been shown before.

The Problem in Modern Society

What then is the extent of the environmental crisis in modern society? Very simply, man has achieved a certain mastery over the world because of his scientific achievements and subsequent technological advancements. We are told that he "is at the top of the food chain" (Mergen , 1970, p. 36) by his mastery of much of the earth's flora and fauna. Because of the exponential (geometric) explosion of the human population, increasingly greater "pressures will be placed on our lands to provide shelter, food, recreation, and waste disposal areas. This will cause a greater pollution of the atmosphere, the rivers, the lakes, the land, and the oceans" (Ibid.).

All of this has been explained most graphically by the National Geographic Society in a chart entitled "How Man Pollutes His World" (1970). Here the earth is "divided" into air, land, and sea, although it is now vital to understand that this satellite is self sustaining, is possessed only of a finite quantity of oxygen, water, and land, and has no means of reconstituting itself with further natural resources once the present supply is exhausted. This means that man must give

immediate attention as to what the effect of supersonic jet aircraft is on the atmosphere at various levels; what increasing urbanization will mean insofar as strain on the physical environment is concerned; how significant the stripping of vegetation is to the earth's soil supply and to its ability to produce oxygen; how dangerous the effects of the mercury waste, the harmful pesticides, the chemical fertilizers, and the trash and sewage disposal are to the natural environment; and what the oil spills and dumping at sea will mean to the earth's great bodies of water and their ability to sustain fish, bird, and bottom life. We need to ask ourselves questions about the extent to which nature's self-renewing cycles are being disturbed. To reiterate a point made earlier, what sort of a world will the more than six billion people of the year 2000 inherit?

Thus, in the United States alone, many rivers, lakes, and streams are being used as sewers; the air in some cities is so polluted that one might as well be smoking a pack or so of cigarettes daily; New York City alone is estimated to have as many rats as it has people (more than eight million); three and a half billion tons of garbage are produced each year; more than four-fifths of the original forests have been converted for other purposes, as has 280 million acres of crop and range land; at least 3,000 acres a day is covered with concrete and other black top substances; and various other types of "parasitic action" are taken by man. And, of course, many other nations in the world are following the same path, not to mention the underdeveloped nations who are "standing in the wings" waiting their opportunity for "the good life." Further, if all of this may sound a bit melodramatic, as these words are being written there are news stories in the press explaining how "a global network of inter-

national agricultural research centers, none of them more than twenty years old, is facing an 'explosion' of demands from individual nations for help in increasing food production to meet rapid increases in population" (The New York Times, Aug. 3, 1975, p. 20). And still further, "air pollution plagued several large and populous areas along the Eastern seaboard today, causing serious potential hazards for people with respiratory or other health problems and at least some discomfort for countless others" (Ibid., p. 37).

This diatribe could be continued, but hopefully the point has been made. Certainly the gravity of the prevailing pattern of life is recognized by many, but such recognition must become knowledge to a great many more people who are in a position to fashion positive action in the immediate future. Interestingly enough, "a group of Protestant theologians asserted . . . that Christianity had played its part in provoking the current environmental crisis and that any solution to it would require major modification of current social and religious values" (The N.Y. Times, May 1, 1970). Attending a conference whose theme was the "theology of survival," it was stressed that typical Christian attitudes "toward nature had given sanction to exploitation of the environment by science and technology and thus contributed to air and water pollution, overpopulation, and other ecological threats" (Ibid.). The participants agreed that the desirable changes would have to be brought about by local, regional, national, and international political action, but such improvements would never be realized without prior radical alterations in man's fundamental attitudes (values) toward nature and all of the flora and fauna therein. All of these thoughts and ideas are encouraging, of course, and one can only hope

that positive, concerted action will be forthcoming. However, when an ecologist decries the "fragmented approach that we tend to take in seeking solutions" (G.J.C. Smith, 1971, p. 69), and when noted scientists like Paul Ehrlich asserts that The President's Council on Environmental Quality is "dodging the crisis" through its inability to make available the best scientific advice to the President (Saturday Review, Nov. 7, 1970, p. 73), one cannot be criticized for shaking his head somberly and wringing his hands in silent despair. Hopefully, the reader at this point will realize the necessity for all of us to be responsible, enlightened citizens ready to take our places in groups promoting desirable political action.

Philosophical Analysis

How does one approach a question such as the influence of ecology or the "environmental crisis" philosophically? Presumably no one philosophical position or stance would actually include any tenets designed to bring about the end to life on the Planet Earth as it has been known. Of course, some particularistic approaches might be so despairing and pessimistic about the future that the inevitability of man consciously or unconsciously destroying himself and his fellows is a distinct possibility.

In a highly interesting article, however, Holmes Rolston has asked what to many might seem like a contradiction -- "Is There an Ecological Ethic?" (Ethics, Jan., 1975, 93-109). He inquires whether an environmental ethic -- the values that men hold about their environment -- is simply based on a specific ethical approach (within a philosophical position) or whether there is actually a built-in naturalistic ethic in the universe. Commencing from the position that the dividing line between science and ethics is definite

if one but accepts the philosophical categories of descriptive law and prescriptive law as being separate and distinct, Rolston explains that descriptive law, presented in the indicative mood, is employed in science and history. Prescriptive law, on the other hand, is used in ethics, and the imperative mood is involved implicitly or explicity. Thus, in moral philosophy the quickest way to be accused of committing a naturalistic fallacy is to blithely assume an "ought" from an "is" -- at least in the eyes of philosophers with a scientific orientation. Transposed to the discussion of so-called "ecological ethics," environmental science should tell us what man thinks he knows through observation, experimentation, and generalization about the environment. Environmental ethics, on the other hand, means presumably that man has applied one or another set of ethical values to his understanding of and relationship to the environment.

Interestingly enough, those who argue for the concept of 'ecological morality' have differences in opinion that take adherents in one or the other direction: (1) those who equate homeostasis with morality, and (2) those who appear to go even further by arguing that there is "a moral ought inherent in recognition of the holistic character of the ecosystem" -- which results in an ecological ethic (Holston, 1975, p. 94). In treating #1 above first, Rolston seeks a "moral translation" from the paramount law in ecological theory -- that of homeostasis (i.e., a closed planetary ecosystem, recycling tranformations, energy balance, etc.). Paul Sears is quoted to the effect that "probably men will always differ as to what constitutes the good life. They need not differ as to what is necessary for the long survival of man on earth . . . As living beings we must come to

terms with the environment about us, learning to get along with the liberal budget at our disposal . . . we must seek to attain what I have called a steady state" (Sears in Shepard and McKinley, 1969, p. 401).

Here the argument appears to be as follows: if you wish to preserve human life -- and you ought to do so -- the ecological law (that the life-supporting eco-system must re-cycle or all will perish) indicates that technically you ought not to disturb the eco-system's capability to re-cycle itself -- and according to moral law (which equals natural law) you ought to assist such re-cycling wherever possible. With this approach (logic) the values are not strictly inherent in the make-up of the world; they are ascribed to it by man attempting to employ careful husbandry with what he has assumed to be his possession (the earth). Rolston argues that we can call the balance of nature (and the ends which we seek that are presumably compatible with an ecosystemic balance) "ultimate values if we wish, but the ultimacy is instrumental, not intrinsic" (p. 98).

The other major claim, referred to above, allows one to employ the term "ecological ethic" without the use of quotation marks, because the assumption is "that morality is a derivative of the holistic character of the ecosystem" (p. 98). Rolston recognizes that this is a radical idea that will not receive ready acceptance. It endows nature and its integral ecosystem with value. This is obviously a proposal for the broadening of the concept of value -- nature in and of itself would have value whether man was here to appreciate it and employ it for his purposes or not! The leap is made from "is" to "ought" because "the values seem to be there as the facts are fully in" (p. 101).

Because of past philosophical and religious speculation, not to mention so-called philosophy of science, it is extremely difficult to find a logical place for a primary ecological ethic in which man's long-standing "classical ought has been transformed, stretched, coextensively with an ecosystemic ought" (p. 104). Are intelligent human beings ready to agree that "egoism should be transformed into ecoism" (Ibid.)? Thus, the self would be identified with Nature as one of its components, as part of the ecosystem. It would not be man and nature; it would be man in nature with such a transformation of outlook. Then man would have a much stronger obligation to preserve nature's balance, because he is truly a part of the world -- and the world is a part of his body!

With such an outlook, man would create what might be called Ecological Man, and he might be able to postulate an authentic naturalistic ethic:

> Man, an insider, is not spared environmental pressures, yet in the full ecosystemic context, his integrity is supported by and rises from transaction with his world and therefore requires a corresponding dignity in his world partner. Of late, the world has ceased to threaten, save as we violate it. How starkly this gainsays the alienation that characterizes modern literature, seeing nature as basically rudderless, antipathetical, in need of monitoring and repair. More typically modern man, for all his technological prowess, has found himself distanced from nature, increasingly competent and decreasingly confident, at once distinguished and aggrandized, yet afloat on and adrift in an indifferent, if not a hostile universe. His world is at best a huge filling station, at worst a prison or "nothingness." Not so for ecological man; confronting his world with deference to a community of value in which he shares, he is at home again. (pp. 107-108)

Implications for Education

Even though the difficulty of moving from an "is" to an "ought" has been recognized above in the realm of science and ethics, there

is quite obviously a number of scientific findings classified as environmental science which should be made available to the citizenry of all ages whether these children, young people, or adults are enrolled in educational institutions or are part of the everyday world. Simply making the facts available will, of course, not be any guarantee that strong and positive attitudes will develop on the subject. It is a well-established fact, however, that the passing of legislation in difficult and sensitive areas must take place through responsible political leadership, and that attitude changes often follow behind -- albeit at what may seem to be a snail's pace. The field of education must play a vital role in the development of what might be called an "ecological awareness." This is much more than the former approach which was usually called the Conservation Movement within forestry and closely related fields that was bent on the preservation of this or that feature of nature. Now ecology (or environmental science) places all of these individual entities in a total context in which the interrelationship of all parts must be thoroughly understood.

Sound educational planning should take place at all levels -- from early childhood education through free tuition courses that are now being offered to many elderly citizens by certain universities. As Mergen states, "the knowledge that has been accumulated is vast, and ecological principles should be made part of the educational menu for economics, city planners, architects, engineers, the medical profession, the legal profession, religious groups, and all people concerned with the public and private management of natural resources, as well as politicians and governmental employees" (1970, p. 37). Obviously, those concerned professionally with physical education

and sport, health and safety education, and recreation and park administration from the standpoint of professional education have a most important stake in this total educational process equally as much as all of those mentioned in Mergen's listing. As a matter of fact, these latter three professions are more concerned than most with man himself and with his interrelationship to his total environment whether natural or man-made.

Presumably the usual educational struggle will prevail among those who will want to introduce a new subject in the curriculum; those who will demand that environmental science be taught incidentally as part of existing subjects within the educational program; and those who will see no need for the study of environmental interrelationships to be in the basic curriculum anyhow. Further, some will want the subject-matter taught as facts and knowledge in a subject-centered curriculum based on a logical progression from the simple to the complex, whereas others will stress that interest on the part of the learner should dictate if and how the subject should be introduced -- because this is the way people learn best. The urgency of the ecological crisis would seem to warrant an approach which "veers neither to the right or left or center." The point would seem to be that a literally devastating problem is upon us, and that we should "move ahead rapidly and soundly" to see that some of the basics of environmental science are made available somehow to all. These other issues have been on hand for so many centuries that they will not be solved "tomorrow" no matter how the crisis is resolved -- or how we attempt to resolve it.

It is difficult to state that certain information and attitudes should be taught to the population of a pluralistic society -- and

then to look forward confidently to the effective execution of such a pronouncement throughout the land. This is simply not the way that things happen in countries like the United States and Canada, for example, where educational autonomy prevails in the many states and provinces, respectively. All that can be hoped is that knowledge about the several positions regarding economic growth will be made available fairly to the people as a controversial issue. Above it was mentioned that certain ecological theories and economic theories indicate quite clearly that following recommended courses of action as promulgated by these theorists, respectively, will presumably result in a seemingly impossible position in the near future.

B. G. Murray, an ecologist, makes it quite clear that Americans (U. S. citizens, not necessarily Canadians) are definitely being placed in a position where a decision will have to be made between a continuous-growth economic policy or a no-growth one. This does not appear to be an "either-or" matter in the eyes of the adherents of each of these theories about which direction should be taken (1972, p. 38). Immediately it is apparent that citizens typically are not even aware that some scholars are recommending such a thing as a no-growth policy. Is this not the land of capitalism and democracy where a steadily increasing Gross National Product is a quite certain indicator of economic prosperity? One wonders whether it is a case of the optimists saying, "full speed ahead, if we ever hope to reduce poverty in the United States," and the pessimists responding with the idea that "population and economic growth must certainly strive for steady-state by the next century (if that is not too late)." Who ever heard of such nonsense as a steady-state situation? This is the most difficult task that educators are facing

as they attempt to carry forward the various forecasting models developed by scholars in both the natural sciences and the social sciences.

In a comparison of these conflicting models between ecology and economics, Murray examines the concepts of 'growth,' 'movement of materials,' and 'competition.' First, in regard to growth, he explains that all types of biological growth follow a characteristic pattern which in time reaches a steady state or equilibrium in which as many organisms are dying as young are being born into the system. In United States business, however, the high standard of material living has been reached by continuously increasing growth in GNP to meet the needs and demands of a continuously increasing population. Question: how long can this growth curve be maintained -- and at what cost to all (including the rest of the world)? It is explained further by Murray that "such continuous growth curves are not unknown in biological and physical systems" (Ibid.). However, the result typically leads to a disastrous result -- death of the host organism as when uncontrolled cell growth takes place in cancer, or even when the chain reaction of fissioning uranium-235 nuclei result in the "inefficient use of energy in nuclear explosions" (p. 39). The rule of the ecologist here implies that a system will eventually collapse unless it stops growing at some point and recycles.

The second concept discussed is the 'movement of materials," and here reference is being made to the bio-geochemical cycles operative within nature -- "the movement within ecosystems of minerals, water, oxygen, carbon dioxide, and other nutrients essential for life" (Ibid.). One example of this process, of course, is that which carbon dioxide follows on its cyclic path between the earth's atmos-

phere and the many organisms that inhabit this planet. Interestingly enough, the recycling that takes place is not completely efficient, with a result that the process known as "succession" results in a somewhat different make-up based on the ecosystem's chemical composition. The serious difficulty created by man is that both his food requirements and the demands of his vast technological progress are simply not recycled in such a way as to sustain even a steady-state situation indefinitely. In other words, the "movement of materials" (as implied in Murray's concept of 'movement of materials') is all in one direction -- for the temporary service of the earth's expanding population (that is increasing in number exponentially)!

Thirdly, and lastly, the other fundamental rule of ecology is discussed -- sooner or later competition excludes some of the competing species. Practically this means that, if two organisms are competing for an exhaustible resource (and which one isn't in a closed system?), one of the competitors will be dispensed with by its rival "either by being forced out of the ecosystem or by being forced to use some other resource" (Ibid., p. 64). Thus, there exists a basic contradiction between the economic theory that states "competition is supposed to maintain diversity and stability systems," and the theory based on the ecological model described above which has been tested in both natural and laboratory situations.

By now it should be readily apparent to all that this issue of conflicting models and resultant theories should have an overriding priority for inclusion "somewhere, somehow, and very soon" in the educational system. We need to know what all of this means to the cherished concepts of 'increasing growth,' 'competition,' 'capitalism,' 'advancing technological revolution,' and other such terms. The

merging of tenable principles of environmental science with altered values and norms into acceptable and highly desirable educational theory and practice represents an immediate challenge for all educators in programs that have either a disciplinary or professional education orientation.

Implications for Physical Education and Sport (including health & safety education and recreation and park administration)

If the field of education has a very definite responsibility and strong obligation to present the various issues revolving about what has rapidly become a persistent problem (or social force) in North American society (and especially so in the United States), this duty obviously includes the teaching professionals at all educational levels who are specialists in all of the subject-matter areas taught in the curriculum. The primary concern in this context is, of course, with those who teach in physical education and sport (and/or some combination of health & safety education and recreation and park administration). (The reader will appreciate immediately that these three fields are now designated as allied professions, even though many physical educators and coaches get involved typically with certain duties that often are carried out by the professional practitioners in one or both of the other two allied fields. The same can be said, of course, for personnel functioning in each of the two allied fields.)

The physical educator and sport coach, as do those practicing in the other two allied professional fields, quite naturally has a certain general education responsibility to all participants in their classes or their community recreation programs. Thus, he

is directly concerned with man's relationship with himself, his fellow man, other living organisms, and also the physical environment and the remainder of the biological environment. A responsible citizen and educator will have an understanding of world-wide population growth and what problems such growth is going to present to man. Granted that there are conflicting views on this matter, the student should at least be able to expect that his instructor will have a reasoned position about this controversial issue. The physical educator and coach should also understand how continuous-growth economic theories contradict basic ecological theory. There can be no argument about the fact that both population growth and advancing technology -- the latter with the capability to improve the material living standard of all to the extent possible -- seem to be leading Earth's population to a position where some fundamental changes in attitudes and practices will probably necessarily result (or ought to change, at any rate). Although attitudes toward improved international relations have waxed and waned over the decades, the responsible physical educator and coach will realize that the quality of life cannot be steadily improved in some countries on earth without due consideration being given to improving the conditions of all people everywhere. Lastly, the informed citizen and educator will be aware of the urgent need to take care of the manifold ecosystems on this "closed" planet and will do all in his power to assist with the necessary recycling so that a "reconstituted" earth will be transmitted to future generations.

Now we must consider whether there are any specific implications for the physical educator and coach as he faces his own

professional task. As matters stand now, he is confronted daily with the fact that for a variety of reasons modern, urbanized, technologically advanced life in North America has created a population with a very low level of physical fitness with a resultant decrease in overall total fitness. What makes matters so extremely difficult is that the large majority of the population has been lulled into a false sense of complacency by what Herbert Spencer over a century ago called a "seared physical conscience" that is unable to "monitor" the body properly and accurately (1949, p. 197). As a result of this presumed sense of complacency, there is an unwillingness to lead a life similar to that of their forebearers that may indeed be characterized as "physically vigorous." What we have created, therefore, is a ridiculous situation in which people on this continent are to a large extent overfed and poorly exercised, whereas a multitude of people on many other continents on earth are "underfed" and often quite strenuously exercised! All of this adds up to a world situation that may well bring disaster to us all before Planet Earth is barely into the twenty-first century.

Although many professions will undoubtedly be "focusing in" on this dilemma soon, it is the profession of physical education and sport that is uniquely responsible for the exercise programs that will enable "man (and woman) to be a rugged animal fit to withstand the excessive wear and tear that life's informal and formal activities may demand" (Zeigler, 1964, p. 55). Additionally, it is this same physical educator who gets involved with health education courses in which nutritional practices and habits are discussed.

Once again, as Spencer indicated earlier, "generally, we think, the the history of the world shows that the well-fed races have been the energetic and dominant races." He explained further that animals can work harder when they are fed more nutritiously. The point he wishes to make is that a sound diet is necessary for both energy and growth (1949, p. 191). What this adds up to is that the physical educator/coach is typically also in a situation where he teaches about nutrition at least indirectly in daily practice -- and quite often directly in classroom situations. Thus, he can to some extent advise his students about the correct food to eat so that he may lead a physically vigorous life, as well as which amounts of what food will enable him to receive adequate nutrition to maintain normal health -- not to mention advice about how to keep from being overweight or underweight.

These factors of a vigorous exercise program and correct nutritional instruction relate quite directly to the two aspects of the ecological crisis discussed earlier -- that is, the pollution of the earth and its atmosphere, and adequate nutrition for the children born on this earth. Without getting involved in the moral question of birth control, the physical educator/coach should do all in his power to curtail pollution because it will in a short time -- in a variety of ways -- make it increasingly difficult for man to exercise vigorously and to maintain so-called physical fitness (implying a mind-body dichotomy). When the air we breathe and the water we drink become increasingly impure, how then will we maintain the fitness of all?

Secondly, there is the matter of adequate nutrition for the rapidly increasing population in the countries least able to feed

their offspring. Although some may believe that the Malthusian principle should be allowed to take effect (can it be stopped?) and that the favored nations should take care of their own needs, it would seem to be more humane to keep the world's hungry people as adequately supplied with staples as possible -- but at the same time we in physical education should redouble our efforts to make certain that young people learn correct eating habits to guarantee relatively lean and fat-free bodies that are nevertheless quite capable of vigorous exercise to ensure physical fitness. There is so much food wasted on this continent that our moral sense should be affronted. For example, how many people could be kept alive with our garbage? Or to view the question in another way, is it quite so necessary that millions upon millions of dogs and cats be sustained when human beings are dying of malnutrition? Perhaps so; however, we might make an effort to cut down the breeding of the canine and feline population somewhat, while we are exporting human birth control to the rest of the world's undeveloped nations.

In addition, people at all stages of life show evidence of a variety of remediable physical defects, but there is typically an unwillingness on the part of the public to make exercise therapy programs readily available through both public and private agencies. Reference here is not directed at the many physio-therapy programs available briefly after operations or accidents. Such assistance is typically most helpful and fills an important need. The concern is with the unavailability of exercise therapy programs in the schools and certain private agencies under the supervision of qualified physical educators upon exercise prescription

by a physician.

Keeping in mind the ecological principle that "competition kills competitors," it would appear to be the direct responsibility of the physical educator/coach to involve all young people, male and female, normal or with remediable or permanent defect, in that type of vigorous program of physical activity -- human movement in sport, dance, and exercise -- that can be characterized as interesting, joyful, and exuberant. In this way it is quite possible that interest will be maintained throughout life. If such were to be the case, the society could possibly then be characterized as a "nation of good animals" able to again meet the criterion of a necessary "first condition" for the maintenance of independence and prosperity -- a population characterized by a quality of physical fitness within a concept of total fitness (Spencer, 1949, p. 177). (In the process we should presumably direct young people away from such sporting activities as the use of snowmobiles, auto racing, and speedboats which pollute the environment, tend to destroy the ecosystemic balance, and provide a mechanical means for propelling the body from one point to another!)

In should be further appreciated that physical education and sport can play an important role in the social and psychological development of the individual. As important as the element of competition may have been in the past -- and may continue to be in the future -- it is now time to place at least equal emphasis on the benefits to be derived from cooperation in the various aspects of sport competition. Most certainly the future of life on this planet will present all sorts of opportunities for cooperative effort both at home and abroad. A wholesome balance between competition and

cooperation in a child's education can develop highly desirable personality traits, while at the same time offering numerous occasions for the release of overly aggressive tendencies seemingly present in so many individuals.

As indicated earlier, those teaching physical education and sport skills often get involved directly or indirectly with health & safety education and/or recreation education. These instructors have some contact with practically every student in the school. Thus, they have great potential for conveying knowledge and assisting in the formation of correct attitudes about all three of these allied fields through effective teaching. Additionally, the physical educator/coach can set an example personally for all young people to follow. For example, the area of health & safety education provides innumerable ways to demonstrate safety practices; personal hygiene; and attitudes (and practice) toward the use of alcohol, tobacco, marijuana, and what presumably are the more harmful drugs. Wholesome attitudes and practice in the area of sex and sex education are also extremely important -- the whole area of family life education for that matter should be taught well both by "precept and practice."

Similarly, the area of recreation education offers many opportunities for the education of man in ways that will promote improved ecological understanding. In the first place, a change in leisure values -- at least as they have been established by many -- should take place. Through recreation education it should be possible to promote an understanding of and respect for the world's flora and fauna, not to mention the whole concept of ecosystemic balance.

Even though so-called post-industrial society is not reducing working hours for many at the rate predicted by some earlier, and many in leadership roles are putting in even longer hours, there is still an urgent need to promote the concept of 'creative leisure.' We need a return to what used to considered by many as the "simple recreational pleasures" -- perhaps with a few variations to satisfy the young. The physical educator/coach should promote the concept of 'physical recreation' for all, of course, but by precept and example the idea of the young person getting involved with aesthetic and creative activities and hobbies (involving "learning" recreational interests) should be fostered as well.

Concluding Statement

Everything considered, the writer has concluded that the influence of ecology is now such that it must be included as a persistent problem along with the other social forces of values, politics, nationalism, economics, and religion. Although it was recognized that there is a dividing line between science and ethics, it is recommended that perhaps morality should now be viewed as being derived from the fundamental, all-encompassing nature of the ecosystem. This plea for the broadening of the concept of value -- perhaps a truly naturalistic ethic -- would have both direct and indirect implications for education to play a highly important role in the development of an "ecological awareness." The physical educator/coach, and those in the allied professions, have a unique function in helping man to develop and maintain physical fitness within a concept of 'total fitness' based on a goal of international understanding and brotherhood.

Bibliography and Selected References

Bibliography

Christophers, The. "God's Good Earth -- and Ours." A pamphlet published by The Christophers, 12 East 48th Street, New York, N. Y. 10017. n.d.

Ehrlich, Paul R., and Holdren, John P., "Dodging the Crisis," Saturday Review, November 7, 1970, 73.

Huxley, Aldous. "The Politics of Ecology." A pamphlet published in 1963 by the Center for the Study of Democratic Institutions, Santa Barbara, California. 6p.

Kunz, Robert F., "An Environmental Glossary," Saturday Review, Jan. 2, 1971, 67.

Mergen, François, "Man and His Environment," Yale Alumni Magazine, Vol. XXXIII, No. 8, May 1970, 36-37.

Murray, Bertram G., Jr., "What the Ecologists Can Teach the Economists," The New York Times Magazine, Dec. 10, 1972, 38-39, 64-65, 70, 72.

National Geographic Society, The. "How Man Pollutes His World." A detailed map of the earth and its atmosphere, with accompanying narrative, published by The National Geographic Society, Washington, D.C., 1970.

New York Times, The, "Nations Demand Agricultural Aid," August 3, 1975. An article written by Victor K. McElheny.

_____, "Foul Air Poses Health Threat to East," August 3, 1975. An article written by Lesley Oelsner.

_____, "Christianity Linked to Pollution," May 1, 1970. An article written by Edward B. Fiske.

Holston, Holmes III, "Is There an Ecological Ethic?" Ethics, Vol. 85, No. 2, January 1975, 93-109.

Sears, Paul, "The Steady State: Physical Law and Moral Choice," in P. Shepard and D. McKinley (eds.). The Subversive Science. Boston: Houghton Mifflin Company, 1969, p. 401.

Smith, Grahame J. C., "The Ecologist at Bay," Saturday Review, Jan. 2, 1971, 68-69.

Spencer, Herbert. Education: Intellectual, Moral, and Physical. London: C. A. Watts & Co., Ltd., 1949. Originally published in 1861.

Zeigler, Earle F. Philosophical Foundations for Physical, Health, and Recreation Education. Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1964.

Selected References

Berg, Alan, "The Trouble with Triage," The New York Times Magazine, June 15, 1975, 26, 28, 30-31, 35.

Burch, William R., Jr., "Recreation and Leisure Time in an Expanding Industrial Society," Yale Alumni Magazine, Vol. XXXIII, No. 8, May 1970, 67, 69-72.

Colwell, Thomas B., Jr., "The Balance of Nature: A Ground for Human Values," Main Currents in Modern Thought, Vol. 26, 1969, 50.

Darwin, Charles. The Descent of Man (new ed.). New York: D. Appleton & Co., 1895. See pages 124-125 for his comments about man's standard of morality and its possible application to all creatures on earth.

Dasmann, Raymond. A Different Kind of Country. New York: The Macmillan Company, 1968.

DeBell, Garrett. The Environmental Handbook. New York: Ballantine, 1970.

Disch, Robert (ed.). The Ecological Conscience: Values for Survival. Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1970.

Dubos, René. A God Within. New York: Charles Scribner's Sons, 1972, pp. 166-167.

Graham, Frank. Since Silent Spring. Boston: Houghton Mifflin Company, 1970. Graham likens Rachel Carson's Silent Spring, published in 1963, to Uncle Tom's Cabin insofar as societal impact is concerned.

Helfrich, Harold W., Jr. (ed.). The Environmental Crisis: Man's Struggle to Live With Himself. New Haven, Conn.: Yale University Press, 1970.

Leopold, Aldo, "The Land Ethic," in A Sand County Almanac. New York: Oxford University Press, 1949, pp. 201-226.

Marsh, George Perkins. Man and Nature: Or Physical Geography as Modified by Human Action. Boston: Harvard University Press, 1965. This is a new edition, edited by David Lowenthal, of Marsh's 1864 classic work on the subject.

Nicholson, Max. The Environmental Revolution: A Guide for the New Masters of the World. London: Hodder and Stoughton, 1970.

Revelle, Roger, and Landsberg, Hans H. (ed.). America's Changing Environment. Boston: The Beacon Press, 1970.